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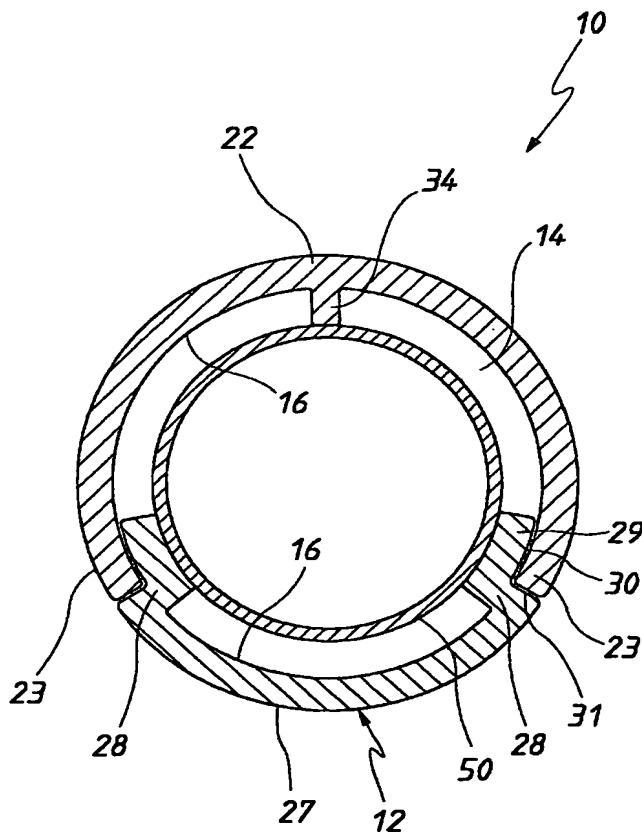
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[Continued on next page]

(54) Title: PROTECTIVE DEVICE



(57) Abstract: A protective device (10) for use in the protection of at least a portion of an elongated article (50) which includes a main body (12), first and second parts (22), (27) which are connectible together such that, in an assembled position the main body has a chamber therein (14). The first and second parts each have two longitudinal extending side edge portions (23), (28), respective side edge portions of the first part being adapted to cooperate with the respective side edge portions of the second part to connect the two parts together in the assembled position.

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SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**Published:**

— *with international search report*

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## PROTECTIVE DEVICE

The present invention relates to protective devices suitable for use with elongated articles such as for example, cables including stay cables for bridges, steel hangers for  
5 bridges, telecommunication cables, power cables and piles supporting structures.

Articles of the type described exemplified above can deteriorate significantly if they are subject to adverse conditions such as fire, explosion, impact or environmental conditions.

10

It is an object according to one aspect of the present invention to provide an improved protective device which can provide at least some protection against one or more of the aforementioned conditions.

15

It is an object according to another aspect of the present invention to provide an improved method of installing a protective device.

20

According to one aspect of the present invention there is provided a protective device for use in the protection of at least a portion of an elongated article, the protective device including a main body, first and second parts which are connectible together such that, in an assembled position the main body has a chamber therein, the first and second parts each having two longitudinal extending side edge portions respective side edge portions of the first part being adapted to cooperate with respective side edge portions of the second part to connect the two parts together in the assembled position. When fitted at  
25 least a portion of the article to be protected is disposed within the chamber.

30

The main body may be open at one or both ends and may be in the form of a tubular member. In some applications the chamber may be filled, after installation with a material such as insulation or cement grout. The two parts are formed as separable sections of the tubular member, the side edge portions extending from one end of the tubular member to the other. The inner surface of the tubular member forms the inner side

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wall of the chamber.

In one form, the cooperating side edge portions of the first and second parts may be arranged to overlap when in the assembled position. The first and second parts may be  
5 partially circular when viewed in cross-section, the first part comprising a major segment of a circle and the second part forming a minor segment of a circle. The side edge portions of the first or second part may include a recessed section for receiving the side edge portion of the other part. It will be appreciated that the first and second parts may be of any other suitable cross-sectional shape. For example, in the assembled position, they  
10 may form a square, rectangle, hexagon or the like.

One of the ends of the main body may be belled for receiving the other end of an adjacent device.

15 Thermal insulation may be provided on the internal surface of one or both parts of the main body. A locating element may be provided which projects from the inner wall of one of the two parts.

The first and second parts are connected together by relative movement in the axial  
20 direction so as to adopt the assembled position.

The main body may be formed from any suitable material. One preferred form of material is known as reactive powder concrete or ultra high performance fibre reinforced concrete. An example of such a preferred type of material is DUCTAL™. DUCTAL is a  
25 cementitious material which is used in a wide variety of structural applications. Various forms of the material are the subject of Australian Patent Specifications Numbers 678271, 682198, 750873, 748678 and 2001235632. The contents of these specifications is incorporated herein by cross reference.

30 The device in its preferred form has several advantages. For example, it can provide for fire protection of the part being protected. It can also provide mechanical

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protection against impact and explosion, caused by vandalism, accident, terrorism and similar action. It requires little maintenance, is extremely durable and will never need replacing. Is easy to install and can be installed during or after construction and without dismantling the existing elongated articles. It can be dismantled and removed then  
5 reinstalled, if required for the inspection of the structure or facility. It has concealed connections. It has a clean appearance, with no external projections.

Preferred embodiments of the invention will be hereinbefore described with reference to the accompanying drawings, and in those drawings:

10

Figure 1 is a schematic end view of a protective device according to a first embodiment in an installed position;

Figure 2 is a schematic side elevation of a series of protective devices in an  
15 installed position;

Figure 3 is a detail schematic partial view of a junction between adjacent devices;

Figure 4 is a similar view as Figure 1 of a second embodiment; and  
20

Figure 5 is a similar view to Figure 3 of the second embodiment.

Referring to the drawings, there is shown a protective device 10 in an installed position on a cable stay 50. The device 10 includes a main body 12 in the form of a  
25 tubular body having an internal chamber 14 therein, the tubular body being open at both ends. The main body 12 includes two parts 22 and 27 each having respective side edge portions 23 and 28 which are adapted to cooperate with one another to connect the two parts together in an assembled position. The two parts 22 and 27 are formed by segments of circle, the first part being a major segment and the second part being a minor segment.

30

The side edge portions 23 of the first part are in essence a continuation of the side

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wall of the body although in the embodiment of Figure 2, a small recess 24 is provided in the inner wall surface 16 so as to form a locating shoulder 30. The side edge portions 28 of the second part include an inwardly stepped section 29 forming a recess 30 and shoulder 31. A locating flange 34 is provided on the inner wall surface 16 of the first part. It will be appreciated that the connecting parts could be oppositely disposed so that the inner wall surface is smooth with the overlapping sections being on the outside of the outer wall surface.

In the second embodiment insulating material 38 is secured to the inner wall surface of the main body.

As best seen in Figures 3 and 5, one end of the main body has a bell end flange 41 thereon to enable fitted connection of adjacent devices. Figure 2 illustrates a number of devices fitted together on a cable stay 50.

15

The two parts of the main body can be fitted together by sliding movement of the two parts relative to one another in the axial direction. To fit the device in position one part is located in the stay. Thereafter the second part is positioned on the opposite side of the stay and then slid into the final interlocked position. If desired the space between the article being protected and the main body of the device may be filled with material such as insulation or cement grout.

Throughout this specification and the claims which follow, unless the context requires otherwise, the word "comprise", and variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps.

The reference to any prior art in this specification is not, and should not be taken as, an acknowledgment or any form of suggestion that the prior art forms part of the common general knowledge in Australia.

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Finally, it is to be understood that various alterations, modifications and/or additions may be incorporated into the various constructions and arrangements of parts without departing from the spirit or ambit of the invention.

## CLAIMS

1. A protective device for use in the protection of at least a portion of an elongated article, the protective device including a main body, first and second parts which are connectible together such that, in an assembled position the main body has a chamber therein, the first and second parts each having two longitudinal extending side edge portions respective side edge portions of the first part being adapted to cooperate with respective side edge portions of the second part to connect the two parts together in the assembled position.  
10
2. A protective device according to claim 1 wherein the cooperating side edge portions of the first and second parts overlap when in the assembled position.
3. A protective device according to claim 2 wherein the first and second parts are connected together by relative movement in the axial direction so as to adopt the assembled position.  
15
4. A protective device according to claim 3 wherein the first and second parts are partially circular when viewed in cross-section, the first part comprising a major segment of a circle and the second part forming a minor segment of a circle.  
20
5. A protective device according to claim 4 wherein the side edge portions of the first or second part include a recessed section for receiving the side edge portion of the other part.  
25
6. A protective device according to any preceding claim wherein when in the assembled position the main body is open at at least one end.
7. A protective device according to any preceding claim wherein when in the assembled position the main body is open at both ends.  
30

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8. A protective device according to any preceding claim wherein one of the ends of the main body is belled for receiving the other end of an adjacent device.
9. A protective device according to any preceding claim further including insulation  
5 on the internal surface of one or both parts of the main body.
10. A protective device according to any preceding claim further including a locating element which projects from the inner wall of one of the two parts.
- 10 11. A protective device according to any preceding claim wherein the main body of the device is formed from material known as reactive powder concrete or ultra high performance fibre reinforced concrete.
12. A protective device according to claim 11 wherein the material is Ductal (trade  
15 mark).

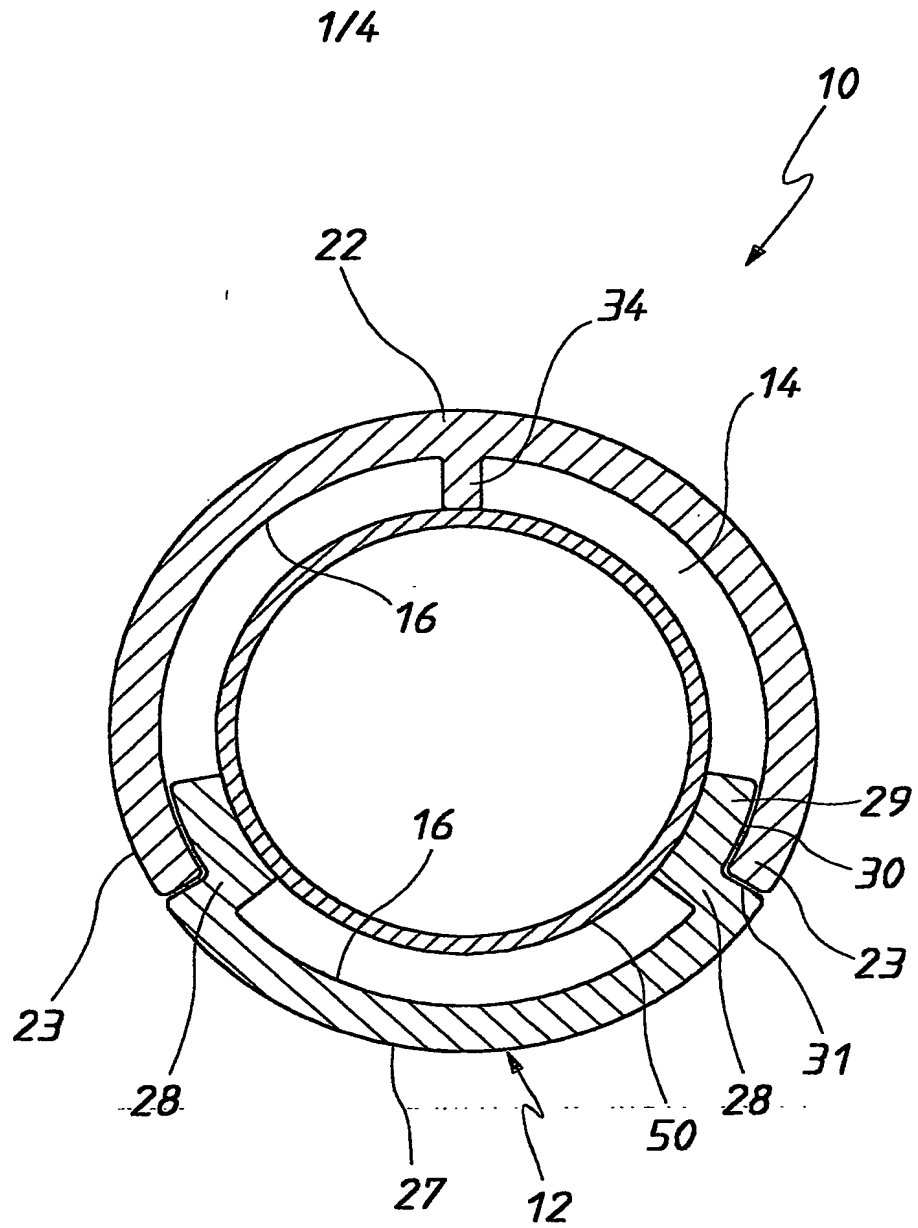


FIGURE 1

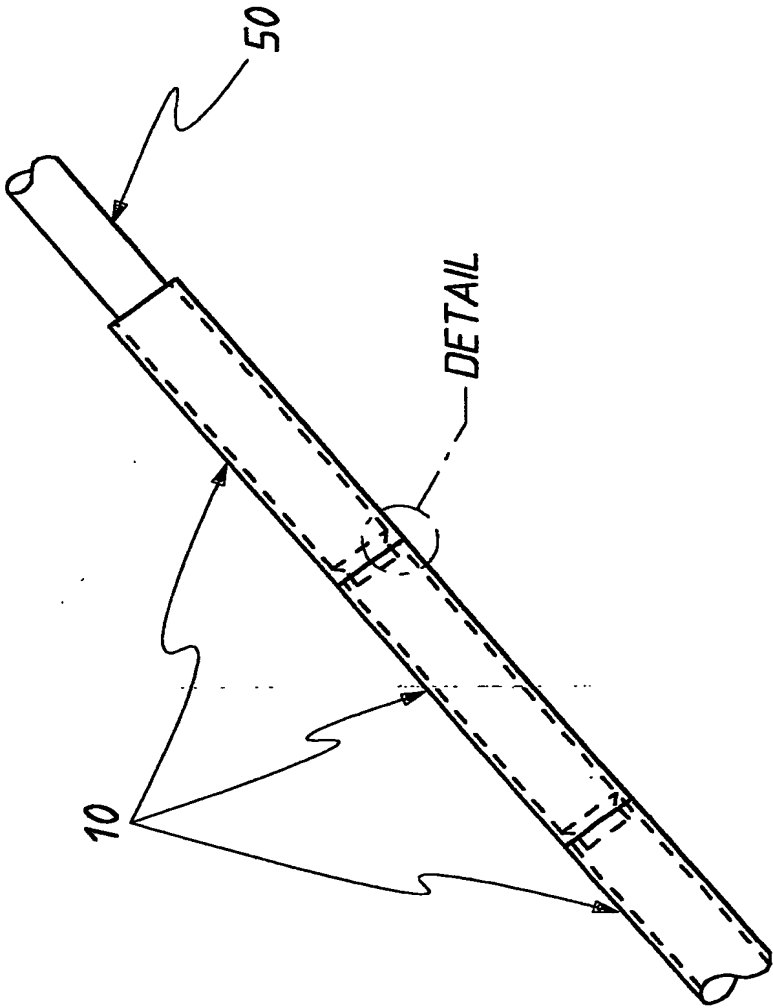


FIGURE 2

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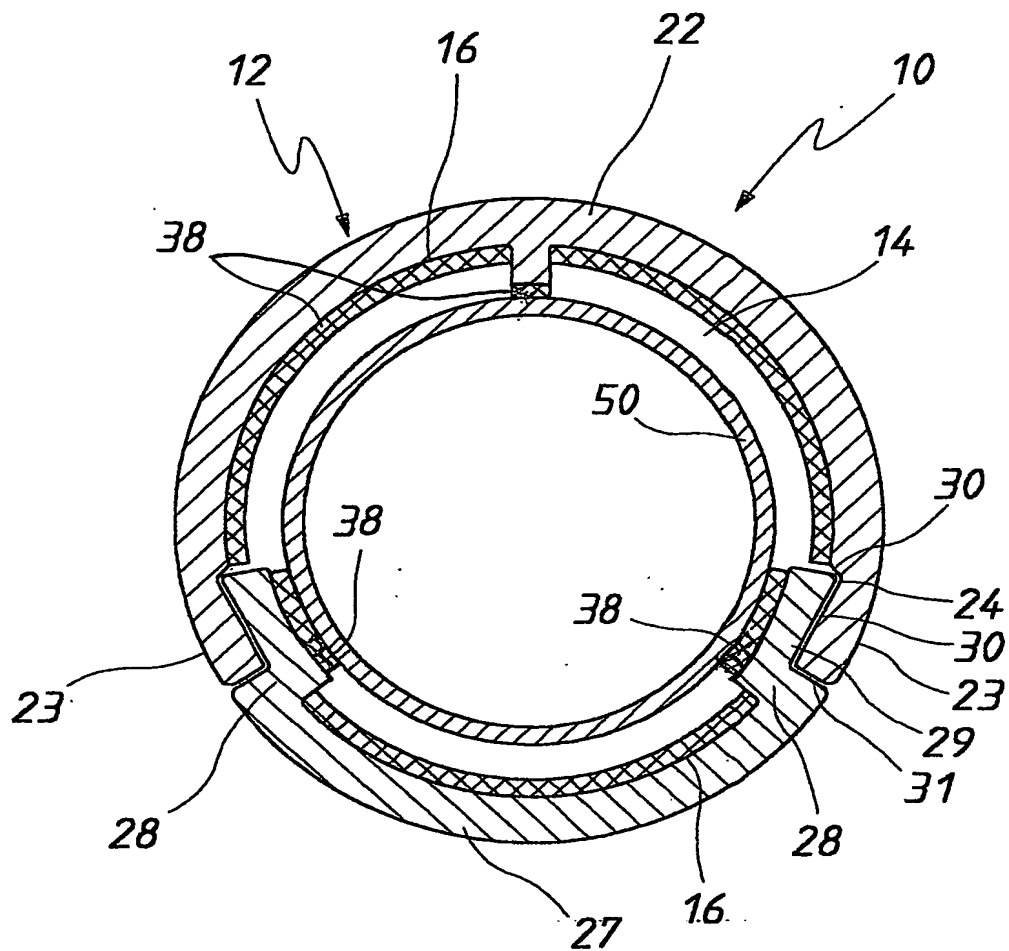


FIGURE 4

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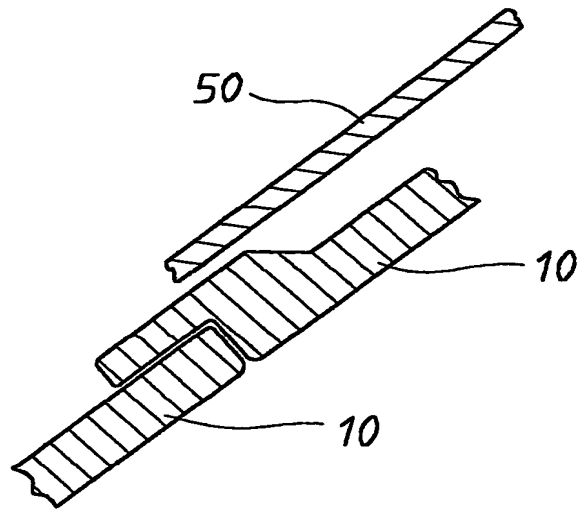


FIGURE 3

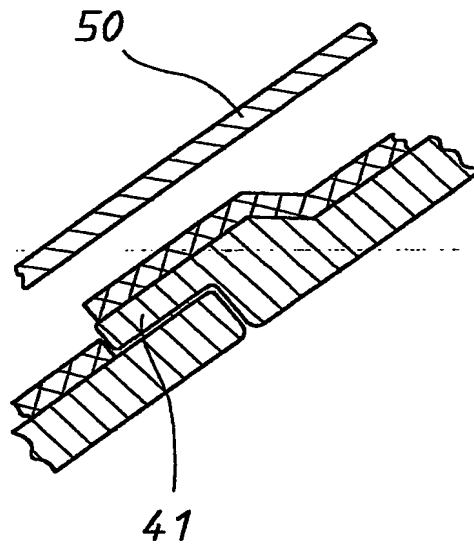


FIGURE 5

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/AU2003/001565

## A. CLASSIFICATION OF SUBJECT MATTER

Int. CL. 7: F16L 3/10

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

DWPI IPC: E01D, F16L, H02G, A62C & keywords: PROTECT, CABLE, ENCLOS, PART, SAFETY, SEGMENT, IMPACT, CYLINDRICAL, INTERLOCK and similar terms

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6431216 B (BRISCOE) 13 August 2002 See Fig.1 and whole document	
X	US 2002/0100517 A (SOMERVILLE ET AL.) 1 August 2002 See figures and whole document	
X	US 6407338 B (SMITH) 18 Jun 2002 See figures and whole document	

☒ Further documents are listed in the continuation of Box C

☒ See patent family annex

* Special categories of cited documents:	
"A" Document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"B" Earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" Document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" Document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" Document published prior to the international filing date but later than the priority date claimed	

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Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No. (02) 6285 3929	Authorized officer  BAYER MITROVIC Telephone No : (02) 6283 2164

# INTERNATIONAL SEARCH REPORT

International application No.  
**PCT/AU2003/001565**

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6250406 B (LUKE) 26 Jun 2001 See figures and whole document	1-12
X	WO 00/02296 A (UNISEAL INC) 13 January 2000 See figures and whole document	1-12
X	Derwent Abstract Accession No.91-363704/50, Class Q41, FR2660332 A (FREYSSINET INT (STUP)) 4 October 1991 See figures, abstract	1-12
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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/AU2003/001565

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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END OF ANNEX					